

# CHROMOSOME NUMBER IN *GOMORTEGA KEULE*<sup>1</sup>

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## ABSTRACT

*Gomortega keule* (Mol.) I. M. Johnston of the monotypic Chilean family Gomortegaceae (Magnoliales sensu lato) has a diploid number of  $2n = 42$ . This number, indicating the palaeohexaploid nature of the family, suggests affinities with those magnoliaceous families with similar high basic chromosome numbers, in particular Atherospermataceae, Siparunaceae, and Monimiaceae belonging to the lauralian alliance. Morphological features such as endospermous seeds, valvate anthers, as well as wood anatomy and pollen, accord with this conclusion.

Plants referred to *Gomortega keule* and reported as  $n = 12$ ,  $2n = 24$  (Raven et al., 1971), have been redetermined as *Bielschmiedia berteriana* (Gay) Kostermans (Lauraceae; Raven, 1975). The chromosome number in *Gomortega* of the monotypic family Gomortegaceae has thus remained unknown until now, and the family is the last in Magnoliales to be counted. The present record thus corrects a past error in the literature and fills a notable gap in the knowledge of cytology in the primitive dicots.

## MATERIALS AND METHODS

Seedlings grown by Dr. Schlegel-Sachs of the Universidad Austral de Chile, from seed collected in the wild, were sent to the Missouri Botanical Garden where root tips were collected from the reestablished plants. Root tips were pretreated in hydroxyquinoline for five hours at room temperature, fixed briefly in 1:3 acetic-ethanol, hydrolyzed in 10% HCl at 60° C for 4 minutes, and squashed in lacto-propionic orcein.

*Gomortega keule* (Mol.) I. M. Johnston.  $2n = 42$ . CHILE. PROV. CONCEPCIÓN: Near Penco, Schlegel-Sachs 6418 (MO).

## DISCUSSION

Gomortegaceae, with  $x = 21$ , is evidently palaeohexaploid and this fact alone tends to suggest affinities with other families of the Magnoliales with a similar level of ploidy. Gomortegaceae is in fact most frequently allied with the so-called lauralian group of families, including Monimiaceae, Atherospermataceae, Siparunaceae, as well as Lauraceae, Hernandiaceae, and possibly Lactoridaceae. Of these, all but Lauraceae ( $x = 12$ ) have high basic numbers, ranging from  $x = 22$  in Atherospermataceae and Siparunaceae,  $x = 19, 18$  (possibly also 22) in Monimiaceae (Goldblatt, 1974),  $x = 20$  in Hernandiaceae, and  $x = 20$  (or 21) in Lactoridaceae (Raven, 1975).

A relationship with Lauraceae and also with Canellaceae has been suggested for *Gomortega*. Studies of wood anatomy (Stern, 1955) and in the case of Canel-

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laceae, pollen morphology (Erdtman, 1952), appear to refute any close relationship; this now seems to be supported by the cytological evidence, with both Lauraceae and Canellaceae palaeotetraploid.

Closer affinities with Monimiaceae, Atherospermataceae, and Siparunaceae, indicated by Stern (1955) and more recently by Schodde (1970) and Thorne (1974), seem more likely. *Gomortega*, with endospermous seeds (in contrast to the nonendospermous seeds in Lauraceae), does appear better placed among these families, particularly Atherospermataceae and Siparunaceae, both of which also have valvate anthers. Pollen morphology does not contradict this since non-aperturate grains like those found in *Gomortega* also occur in certain Monimiaceae and Siparunaceae (Erdtman, 1952). The base number of  $x = 21$  in *Gomortega* certainly accords with the placement of this family among Atherospermataceae, Siparunaceae ( $x = 22$ ), and Monimiaceae ( $x = 19$ ). There is, however, some doubt that these latter three are themselves closely allied (Schodde, 1970), though Atherospermataceae and Siparunaceae may have had a common origin.

On balance it appears that Gomortegaceae is more closely related to this group of lauralian families than to others in the alliance and the cytological data strongly support Schodde's (1970) contention that Gomortegaceae is most closely allied to Atherospermataceae. Additional support for this is found in geographical considerations, with Atherospermataceae occurring in Chile as well as Australia. Other possible affinities cannot be excluded and further data on chromosomes, as well as other information about the fairly large and varied Monimiaceae, may yield valuable information concerning relationships among the families Gomortegaceae, Atherospermataceae, Siparunaceae, and Monimiaceae.

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